



TRUCK/SHOVEL SPREAD DESIGN AND ECONOMIC CRITERIA FOR SURFACE MINING

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SHOVEL/TRUCK MINING METHOD

- **Introduction**
- **Reserve Evaluation**
- **Mine Design and Layout**
- **Sequencing and Timing**
- **Equipment Selection**
- **Economic Evaluation - Appalachia Mining Company**
- **Summary**

INTRODUCTION

- **Applications of Mining Method**
- **History of Mining**
- **Typical Regional Surface Operation**
(Appalachia Mining Company)

Applications of Mining Method

- **Shovel/Truck Mining systems are typically predominate on Mountaintop Removal (MTR) and Area Surface Mining Operations**
 - **MTR Surface Mining - Entails total mineral extraction within a reserve area provided that the entire reserve is economical to mine.**
 - **Area Surface Mining - Entails partial mineral extraction within a reserve area. This method is mainly used when only a portion of the reserves are economically viable to mine.**

History of Mining

- **MTR and Area Mining methods have been in existence and practiced for over forty (40) years.**

History of Mining (Cont.)

- **Equipment productivity limited the overall size of surface mine operations in the early years.**
 - **Economic factors limited mining to low ratio reserve areas.**
 - **Typically, these areas consisted of low ratio seams at the top of mountains and contour mining areas in conjunction with mechanical augering systems.**

History of Mining (Cont.)

- **As equipment productivity and efficiency improved, the economically feasible reserve base expanded.**
 - **Lower yardage costs associated with heavy equipment technology has made it feasible to mine higher ratio reserves.**
 - **Coal seams positioned at lower levels in the mountain have become feasible to mine**
 - **In some cases up to 600 ft. of vertical cover can be mined.**
 - **Remining areas to get to the lower seams has become common practice.**

History of Mining (Cont.)

- **The expanded reserve base has made it economically feasible to increase capital investment in larger, more productive equipment.**
 - **Without the reserves, capital cannot be justified.**
 - **Without the capital, mining higher ratio reserves cannot be economically justified.**
 - **If higher ratio reserves are not mined, mining will likely not be done.**

History of Mining (Cont.)

- **The expanded reserve base associated with mining the lower level seams has increased the size requirements of excess spoil disposal areas**
 - **The low ratio, single seam MTR operations in the past required a low number of relatively small fills.**
 - **Total overburden volume handled in these operations was small.**
 - **Even by placing half of the overburden in valley fills, the quantity was small.**
 - **Larger, more vertical, multi-seam operations of today require a larger number of relatively large fills.**
 - **Total overburden volume handled in these operations is large.**
 - **Placement of only 30% of the overburden in valley fills will result in more larger fills.**

History of Mining (Cont.)

- **A typical regional surface operation (Appalachia Mining Company) is described as follows:**
 - **Multi-seam, mountain top removal operation.**
 - **Total depth of cut is 436 vertical feet.**
 - **A total of eight (8) seams will be mined extending down to the Coalburg seam horizon.**
 - **The overall cumulative ratio is 15.02 to 1.**
 - **The average selling price of the coal removed is \$24.75 per ton.**

Reserve Evaluation

- **Exploratory core drilling**
 - **Define coal and rock thickness.**
 - **Define coal quality.**
 - **Define rock quality (Acid-base assessment and Slake durability)**
- **Have aerial mapping prepared for the reserve area**

Reserve Evaluation

- **Reserve Analysis**
 - Construct a geological model using Surface Mine modeling software.
 - Calculate mining ratios for the project.
 - Calculate total overburden in bank cubic yards (BCY).
 - Calculate total recoverable clean tons (CT)
 - Seams as thin as six (6) inches can economically be recovered.
 - Calculate surface mine strip ratios.
 - Ratio = Total BCY / Total recoverable CT
 - Define coal quality, marketability and market value.

Reserve Evaluation (Cont.)

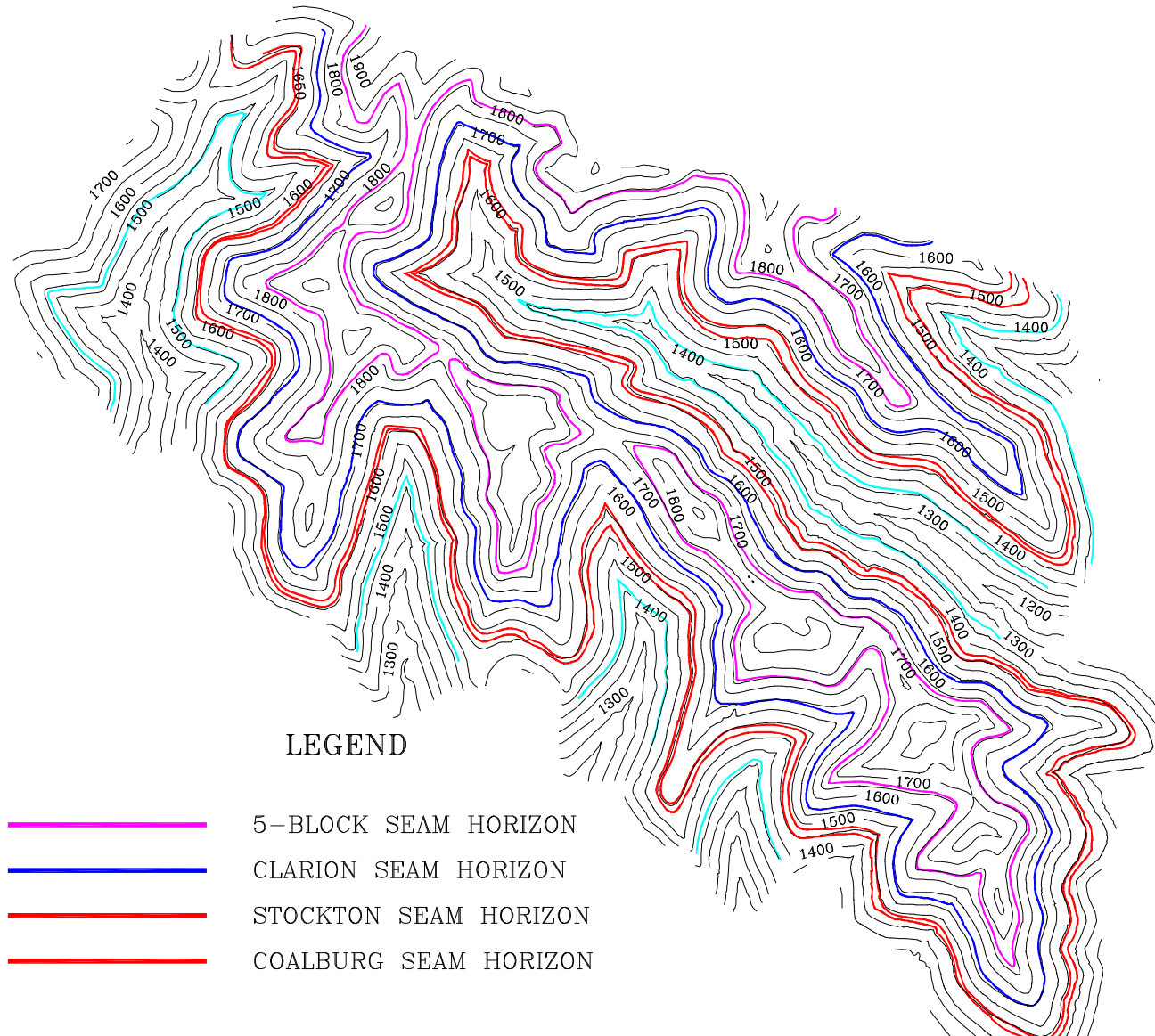
- **Environmental Considerations**
 - **Evaluate the geo-chemical characteristics of the coal and rock.**
 - **Evaluate the geo-physical characteristics of the rock strata.**
 - **Determine availability of excess spoil disposal areas.**
 - **Determine proximity of operation to homes and communities.**
 - **Evaluate the potential effects of blasting operations.**
 - **Evaluate other site-specific environmental issues.**
 - **Incremental and cumulative ratio analysis.**

Reserve Evaluation (Cont.)

- **Ratio analysis case study - (Appalachia Mining Company)**
 - **Typical topographic map detailing reserve recovery area.**
 - **Typical cross section of the reserve area lithology.**
 - **Incremental and cumulative ratio analysis.**

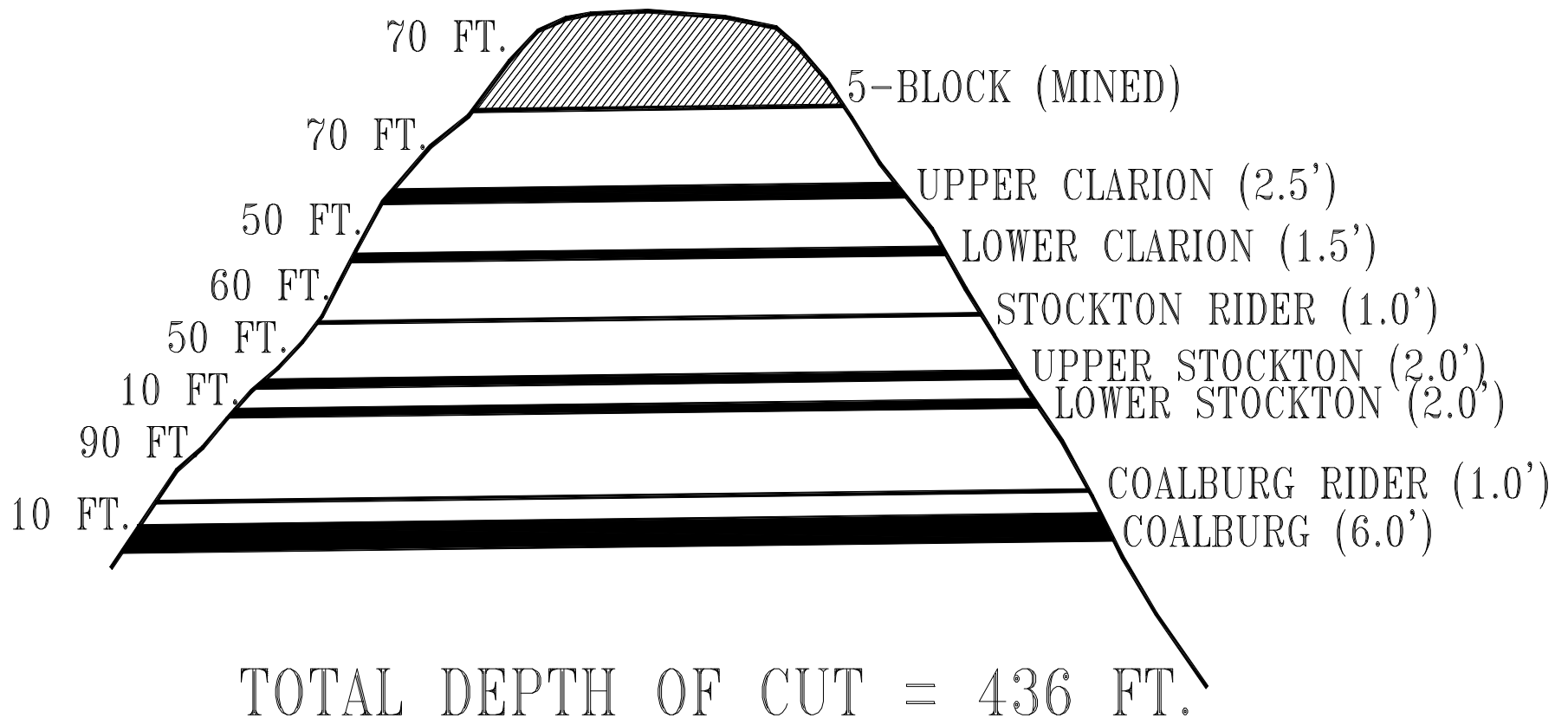
CASE STUDY - APPALACHIA MINING COMPANY

RESERVE ANALYSIS AREA



CASE STUDY – APPALACHIA MINING COMPANY

TYPICAL LITHOLOGY CROSS SECTION



Reserve Evaluation (Cont.)

Ratio Analysis and Reserve Quality

Seam	Inc BCY	Inc C.T.	Inc. ratio	Cum. BCY	Cum. C.T.	Cum. Ratio	Burden Thick. (ft.)	Coal Hght. (ft.)
# 5 Block	7,905,333	0	NA	7,905,333	0	NA	70	0.00
Upper Clarion	18,069,333	871,200	20.74	25,974,667	871,200	29.81	70	2.50
Lower Clarion	19,360,000	784,080	24.69	45,334,667	1,655,280	27.39	50	1.50
Stockton Rider	38,720,000	871,200	44.44	84,054,667	2,526,480	33.27	60	1.00
Upper Stockton	40,454,333	2,056,032	19.68	124,509,000	4,582,512	27.17	50	2.00
Lower Stockton	8,228,000	2,090,880	3.94	132,737,000	6,673,392	19.89	10	2.00
Coalburg Rider	101,930,400	1,359,072	75.00	234,667,400	8,032,464	29.21	90	1.00
Coalburg	11,616,000	8,363,520	1.39	246,283,400	16,395,984	15.02	10	6.00
Total	246,283,400	16,395,984	15.02				410	16.00

Notes:

- 1.) Five Block seam was previously mined.
- 2.) The Five Block Seam was 8 ft. thick and contained 1.4 mm C.T. of coal @ 5.67 stripping ratio.
- 3.) All overburden overburden from Five Block Seam mining is still on the mountain and will have to be moved.
- 4.) Average Coal Quality for the project:

Quality Category	Clean Tons	Quality (ar)						Market Value
		Moisture	Ash	BTU	Sulfur	SO2	M.A.F.	
Sub - Compliance	4,256,420	5.20	10.00	12,800	0.64	1.00	15,094	\$27.50
Compliance	9,563,255	5.35	11.30	12,500	0.74	1.18	14,997	\$24.00
Conforming	2,576,309	5.40	11.45	12,424	0.95	1.53	14,942	\$23.00
Total	16,395,984	5.32	10.99	12,566	0.75	1.19	15,014	\$24.75

Mine Design and Layout

- **Develop a Potential Material Balance Plan.**
- **Develop an Overburden Handling Plan.**
- **Mining Cut Layout.**
- **Case Study - Appalachia Mining Company.**

Mine Design and Layout

- **Develop a Potential Material Balance Plan**
 - **Calculate total volume of Loose Cubic Yards (LCY) in the project.**
 - **LCY = yards of overburden after rock is fragmented and air voids introduced.**
 - **A common term used for this occurrence is “swell factor (SF).**
 - **Sandstone typically swells 25 to 40%. The average is approximately 33%.**
 - **Shale and slate typically swell 15 to 25%. The average is approximately 20%.**
 - **Allowances have to made for re-compaction (typically 90 to 95%).**
 - **The total LCY in a project represents the amount of material that must be placed in spoil disposal areas.**
 - **Calculate total storage volumes for all available spoil disposal areas.**
 - **Define “on-bench” storage capacity.**
 - **Remainder will define required “valley fill” storage capacity.**
 - **Total storage capacity must be equal to or greater than the LCY generated.**

Completion of these operations will result in a “Potential Material Balance” for the project.

Develop an Overburden Handling Plan

- **Define where each yard of overburden will be produced and subsequently placed.**
 - **Define whether each yard will be hauled, dozed, or cast by blasting.**
 - **If hauled, define where it will be hauled to and design the required road system.**
 - **If dozed or cast by blasting, define where the material will be placed.**
- **Develop spoil disposal areas as each yard is placed during this exercise.**
 - **When this sequence is complete, a “Final Material Balance” for the project will be defined.**

Develop an Overburden Handling Plan

- **The objective for developing the Overburden Handling Plan is to accomplish the following:**
 - **Minimize grade and distance requirements for overburden haulage roads.**
 - **Maximize the amount of overburden material that can be cast by blasting or dozed in the project.**
(These are the most economical placement means).
 - **Plan so that the placement of overburden results in final reclamation being accomplished as part of the normal mining cycle of operations.**

Mining Cut Layout

- **Pre-strip Cut Layout**
 - **Pre-strip cuts consist of the mining required to remove the top portions of the mountain to the extent that cast-blasting and dozer operations can commence.**
 - **This pre-strip overburden must be hauled.**
- **Cast-blasting and Dozer Cut Layout**
 - **These cuts are typically designed in long, parallel oriented panels.**
 - **The overburden is placed “on-bench” on the floor of the lowest seam being mined.**
 - **Occasionally the material can be cast/dozed into fills providing the state 300 ft. wing dumping criteria is not exceeded.**

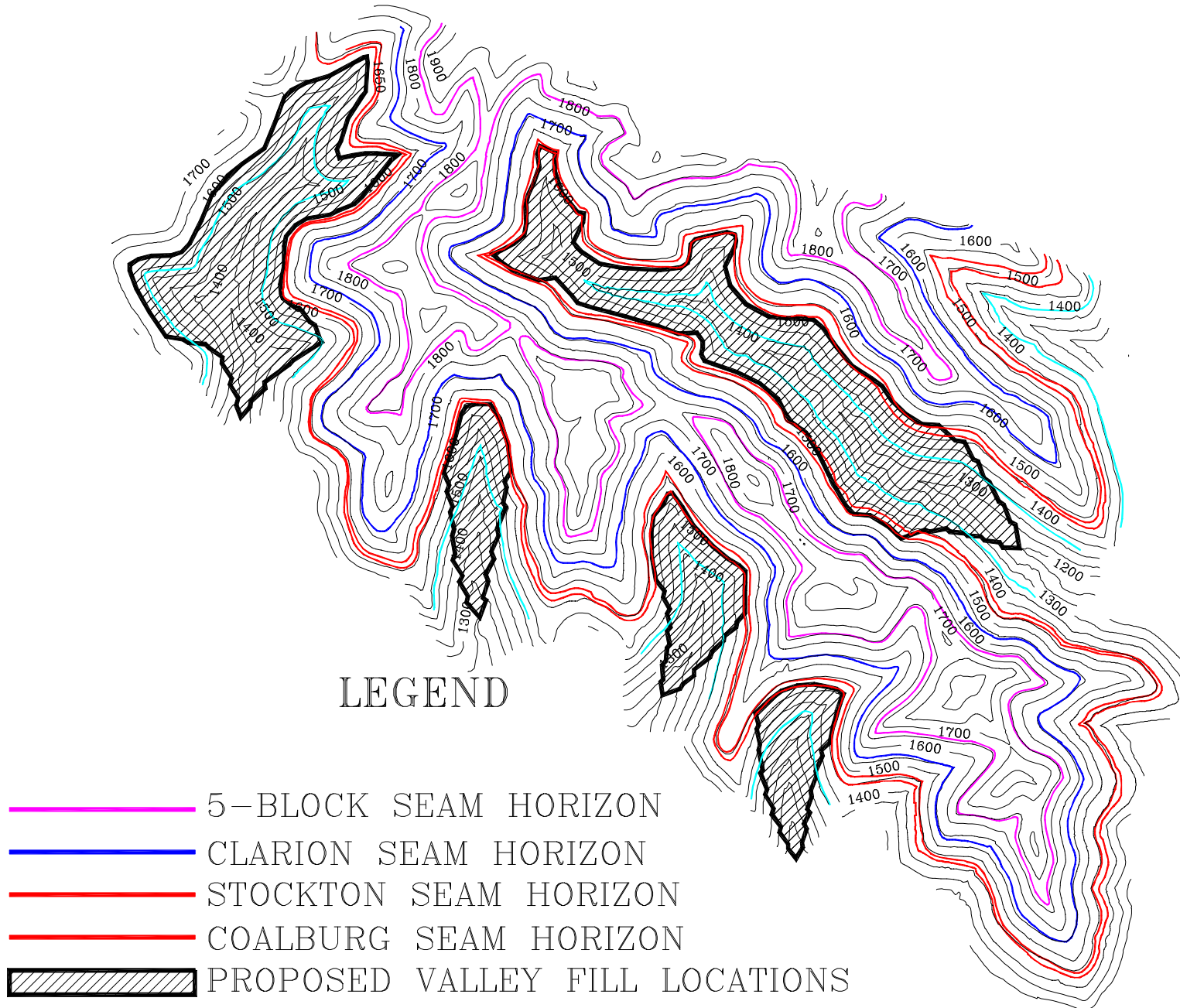
Mining Cut Layout

- **Contour Cut Layout**
 - These cuts are typically designed along the outslope areas of the lower coal horizons to be mined.
 - These cuts are designed to prevent down-slope placement, provide for the establishment of “on-bench” sediment control structures, and to provide sufficient space for the establishment of a network of haulage and access road systems.

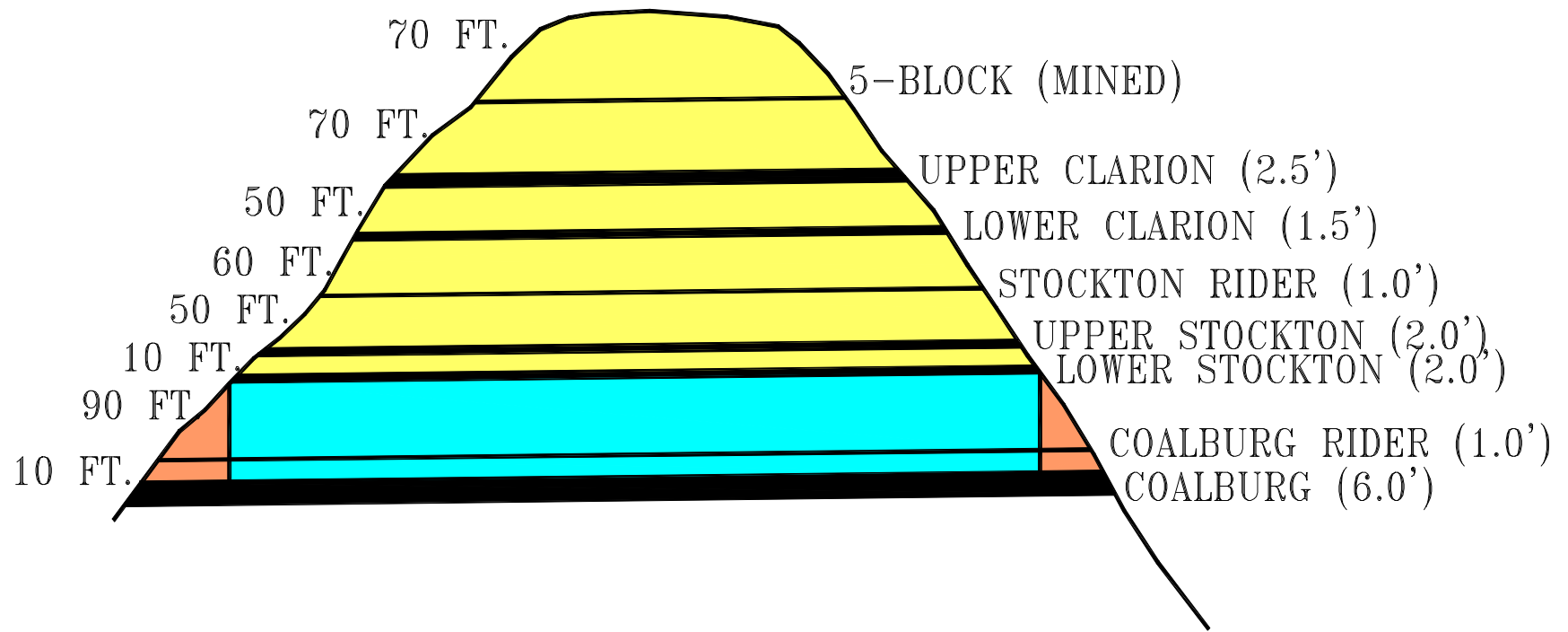
Case Study - Appalachia Mining Company

- **Calculated “Swell Factor” = 30%**
 - **Total LCY in the project area = 320,168,420**
- **Spoil Disposal Capacity (by location):**
 - **128,067,368 LCY placed in “Valley Fills”**
 - **192,101,051 LCY placed “On-Bench”**
- **Distribution of Haulage vs. Cast-blasting and Dozing**
 - **Total overburden haulage = 172,398,380 BCY (70%)**
 - **Total Cast-blasting and Dozing = 73,885,020 BCY (30%)**
- **Typical Haul Road Profile**
 - **2,500 ft. length (one-way haul)**
 - **1,000 ft. of which is at an 8% grade.**

CASE STUDY – APPALACHIA MINING COMPANY



CASE STUDY – APPALACHIA MINING COMPANY MATERIALS HANDLING CROSS SECTION



SEQUENCING AND TIMING

- **Start-up location for operation**
 - **Start-up should occur in areas with easy accessibility and large valley fill capacity.**
 - **All of the overburden generated from the initial mining cuts must be placed in valley fills. (Referred to as development area).**
 - **The initial cuts are predominantly Pre-strip and Contour cuts.**
 - **Dozing is limited to those yards which are positioned within the confines of the valley fills.**
 - **Primary objectives to be accomplished during this development phase are as follows:**
 - **Set up the cast-blasting and dozing production areas as readily as possible.**
 - **Maintain an acceptable mining ratio to ensure an economically feasible development operation**

SEQUENCING AND TIMING (CONT.)

- **Subsequent to start-up and development, the objectives are as follows:**
 - **Maintain adequate levels of pre-stripping in order to sustain continuous cast-blasting and dozer operations.**
 - **Provide at least two (2) areas for cast-blasting and dozing at all times.**
 - **The dozer fleet must rotate between areas in order to maintain continuous production.**
 - **When dozing is complete in an area, it generally takes 2 to 3 weeks to remove the uncovered coal. The dozer fleet cannot sit idle during this period.**

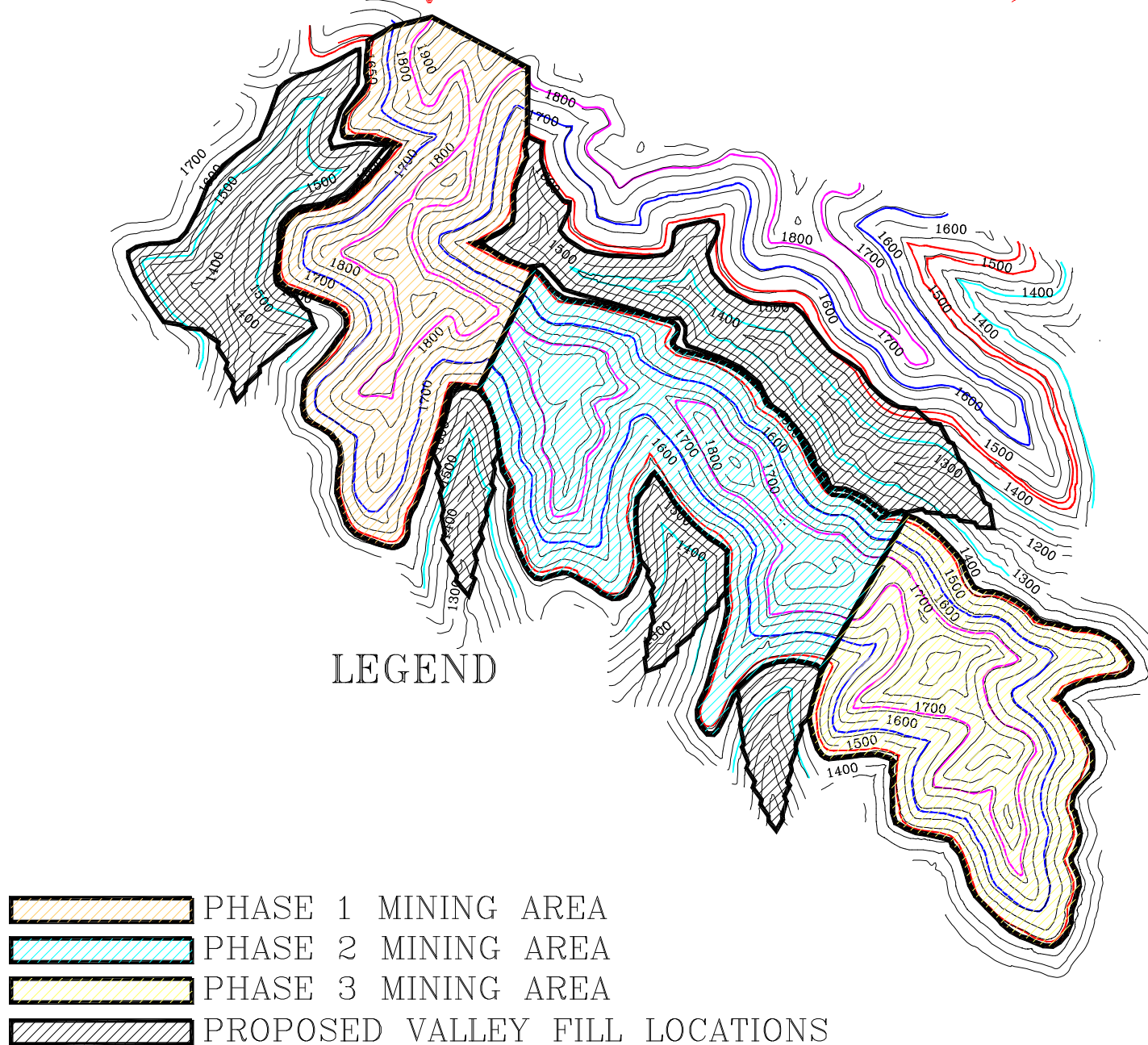
SEQUENCING AND TIMING (CONT.)

- Sequence the dozer/cast areas so that the overburden can be placed on top of the dozer push ridge at the earliest possible time.**
 - This will help to minimize the amount of overburden required to be placed in “Valley Fills”.**
 - The reclamation process will subsequently be accelerated.**
 - Pre-strip overburden can now be more economically placed on the dozer push ridge.**
 - This will minimize longer, excessive grade hauls typically associated with Pre-Strip operations.**

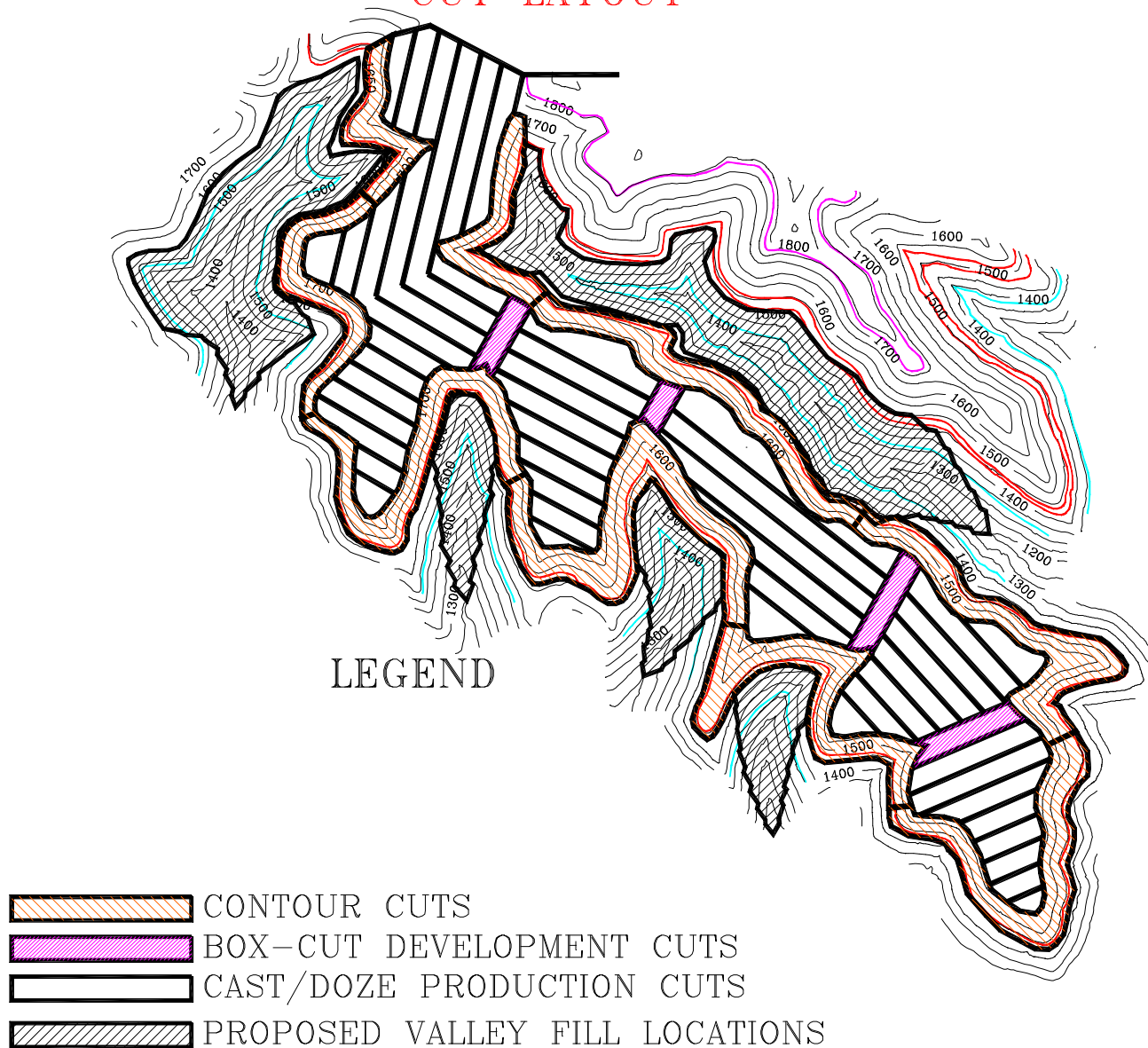
FINAL RECLAMATION

- **The project will end with two (2) dozer/cast areas.**
 - **These areas can only be reclaimed to an elevation slightly higher than the dozer push ridge.**
 - **This factor was taken into account when the amount of overburden designated to be placed in the “Valley Fills” was calculated.**
 - **The elevation of the mountain in the start-up, development area can and will be restored to AOC.**
 - **The elevation of the reclaimed mountain must drop as the last mining areas are approached.**
 - **It is not possible to restore a mining project of this type to AOC throughout.**
 - **A smaller, single seam MTR however, can achieve AOC.**
 - **Case Study - Appalachia Mining Company**
 - **Mining sequence map.**
 - **Regrade Cross Section.**

CASE STUDY – APPALACHIA MINING COMPANY MINE DIRECTION SEQUENCE MAP – PHASES 1,2 & 3

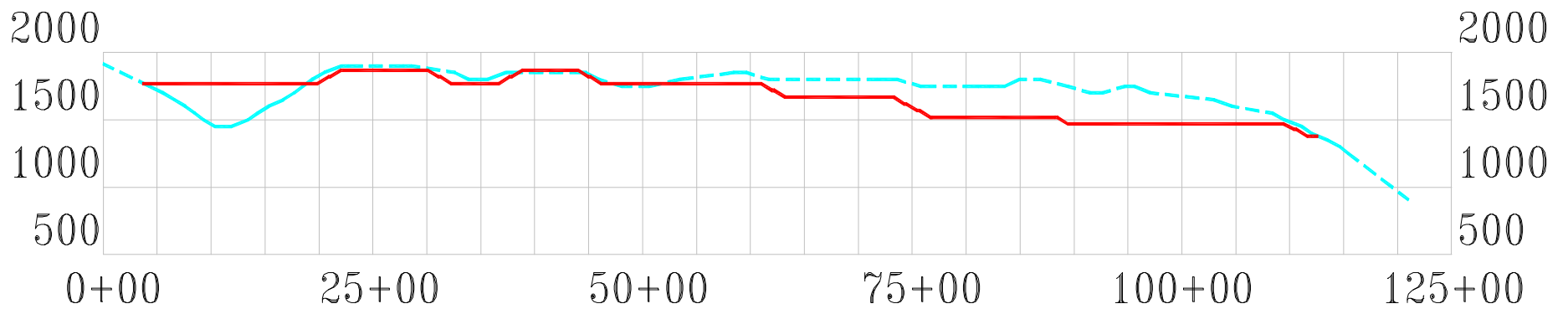


CASE STUDY – APPALACHIA MINING COMPANY CUT LAYOUT



CASE STUDY – APPALACHIA MINING COMPANY

FINAL REGRADE PROFILE



----- ORIGINAL GRADE
----- FINAL REGRADE

EQUIPMENT SELECTION

- **Equipment Selection is based on the following criteria:**
 - **Mine design and layout**
 - **Overburden handling requirements**
 - **Reserve size**
 - **Production Objectives**
 - **Cost Minimization**
 - **Maximize return on investment (ROI)**

EQUIPMENT SELECTION

- **Incremental Cost Behavior of Overburden Production Methods (high to low)**
 - **Overburden Haulage**
 - **Production Dozing**
 - **Drag line**
 - **Cast Blasting**

EQUIPMENT SELECTION

- **Incremental Production Costs of Overburden Haulage Methods (low to high)**
 - **53 yard Electric Shovel spread**
 - **35 yard Hydraulic Excavator spread (Shovel front or Backhoe)**
 - **25 yard Hydraulic Excavator spread (Shovel front or Backhoe)**
 - **18 1/2 yard Hydraulic Excavator Spread (Shovel front or Backhoe)**
 - **16 yard Front Endloader spread**

53 YARD ELECTRIC SHOVEL LOADING 320 TON TRUCKS





**25 YARD HYDRAULIC SHOVEL
LOADING 150 TON TRUCKS**



**25 YARD HYDRAULIC BACKHOE
LOADING 210 TON TRUCKS**

13.5 YARD HYDRAULIC BACKHOE LOADING 150 TON TRUCKS





**16 YARD FRONT ENDLOADER
LOADING 150 TON TRUCKS**

EQUIPMENT SELECTION (CONT.)

- **Case Study - Appalachia Mining Company
Overburden Production Equipment Selection**
 - **25 yard Hydraulic Shovel (7.5mm BCY per year)**
 - **18 1/2 yard Hydraulic Backhoe (5.8mm BCY per year)**
 - **16 yard Front Endloader Spread (4.1mm BCY per year)**
 - **Four (4) 45 yard Bulldozers (7.8mm BCY per year)**



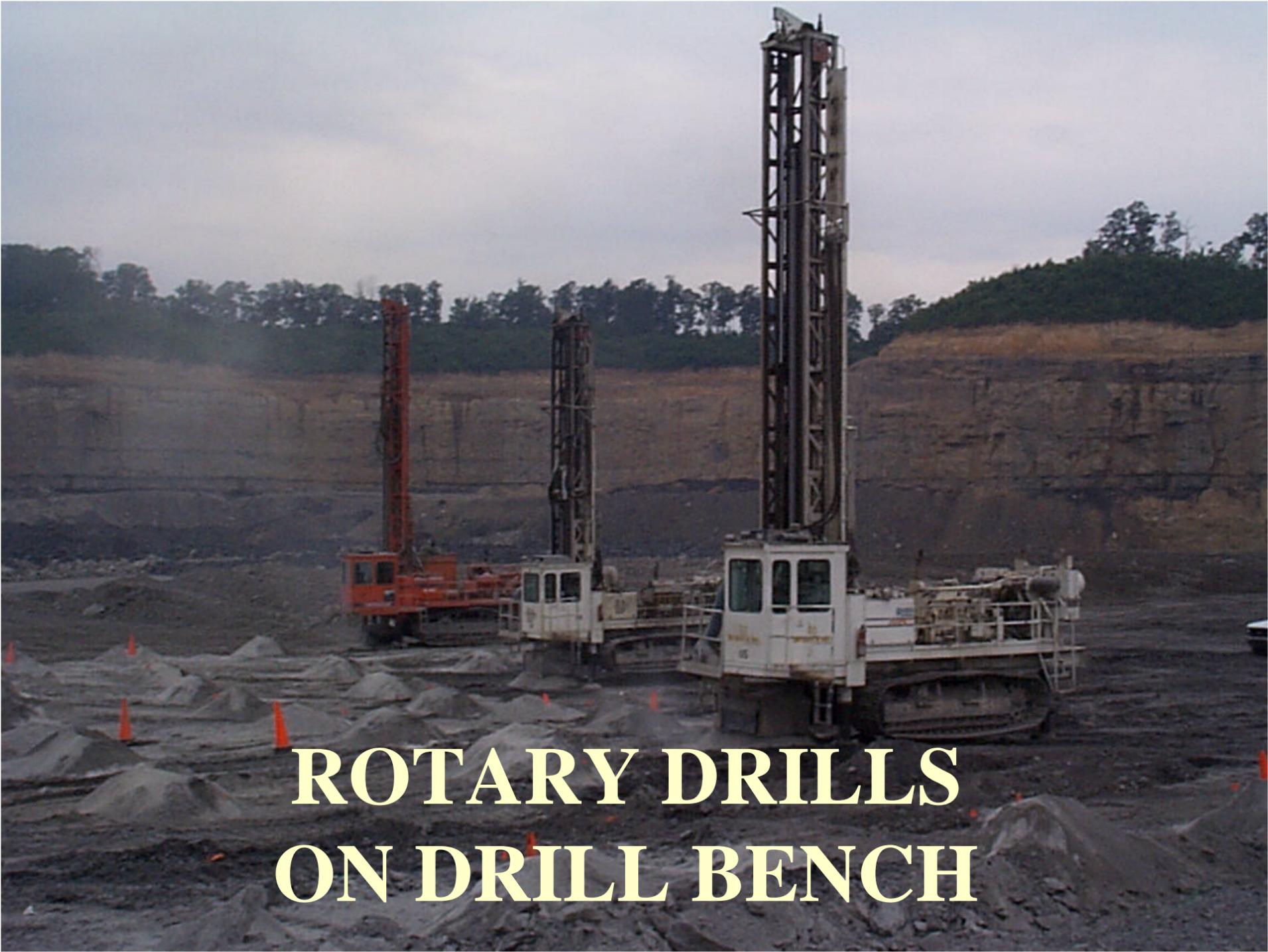
**45 YARD DOZERS IN
SLOT DOZING AREA**



**13 YARD FRONT ENDLOADER
PREPARING COAL**



**13 YARD FRONT ENDLOADER
LOADING COAL**

A photograph of a quarry or construction site featuring three large rotary drills. The drills are positioned on a dark, uneven ground surface, likely a drill bench. The drill on the right is white with a tall, dark mast. The two drills on the left are orange. In the background, a steep, layered rock face is visible under a cloudy sky. Orange traffic cones are scattered on the ground in the foreground.

**ROTARY DRILLS
ON DRILL BENCH**



SHOT PREPARATION ON DRILL BENCH



**RECLAMATION DOZER
WALKING FINAL GRADE SLOPE**

EQUIPMENT SELECTION (CONT.)

- **Case Study - Appalachia Mining Company
Overburden Production Equipment Selection**
 - **Total Annual Production**
 - **25.20mm BCY per year based on two (2) 10-hour shifts working 260 days per year.**
 - **Total Annual Coal Production @ 15.02 Stripping Ratio**
 - **1.68mm Clean Tons per year**
 - **Projected Life of Mine**
 - **10 years**

ECONOMIC EVALUATION APPALACHIA MINING COMPANY

- **Capital Requirements**
- **Manpower**
- **E.B.I.T. (Earnings Before Interest and Taxes)**
- **Capital Investment Statistics**

Economic Evaluation - Appalachia Mining Company

Capital Budget - Life of Mine

Heavy Equipment

Item	Year	Year	Years	
Description	0	1	2 thru 10	Total
25 yard Shovel	\$0	\$3,500,000	\$0	\$3,500,000
18 1/2 Yard Backhoe	\$0	\$2,650,000	\$0	\$2,650,000
16 yard Endloader	\$0	\$1,200,000	\$1,200,000	\$2,400,000
2 10 Ton Rock Trucks	\$0	\$4,500,000	\$0	\$4,500,000
150 Ton Rock Trucks	\$0	\$7,320,000	\$0	\$7,320,000
Fill Dozers	\$0	\$2,160,000	\$1,050,000	\$3,210,000
Development Dozers	\$0	\$1,440,000	\$1,440,000	\$2,880,000
Reclamation Dozers	\$0	\$720,000	\$720,000	\$1,440,000
45 yard Dozers	\$0	\$4,800,000	\$4,800,000	\$9,600,000
16 yard Coal Loader	\$0	\$2,400,000	\$700,000	\$3,100,000
9 yard Coal Loader	\$0	\$1,100,000	\$500,000	\$1,600,000
Drills	\$0	\$2,400,000	\$4,800,000	\$7,200,000
Total	\$0	\$34,190,000	\$15,210,000	\$49,400,000

Economic Evaluation - Appalachia Mining Company

Capital Budget - Life of Mine

Support Equipment

Item	Year	Year	Years	
Description	0	1	2 thru 10	Total
Motor Grader	\$0	\$450,000	\$0	\$450,000
Water Truck	\$0	\$600,000	\$0	\$600,000
5 yard Backhoe	\$0	\$300,000	\$0	\$300,000
Light Plants	\$0	\$150,000	\$0	\$150,000
Mechanics Trucks	\$0	\$520,000	\$0	\$520,000
Fuel Truck	\$0	\$130,000	\$0	\$130,000
Service Truck	\$0	\$260,000	\$0	\$260,000
Portal Trucks	\$0	\$75,000	\$0	\$75,000
Pick-Up Trucks	\$0	\$150,000	\$300,000	\$450,000
Total	\$0	\$2,635,000	\$300,000	\$2,935,000

Economic Evaluation - Appalachia Mining Company

Capital Budget - Life of Mine

Development Capital

Item	Year	Year	Years	
Description	0	1	2 thru 10	Total
Haul Road	\$1,000,000	\$0	\$0	\$1,000,000
Pond Construction	\$500,000	\$0	\$1,000,000	\$1,500,000
Stream Mitigation	\$500,000	\$0	\$0	\$500,000
Permitting Related	\$500,000	\$0	\$0	\$500,000
Exploration	\$350,000	\$0	\$0	\$350,000
Clearing & Grubbing	\$460,000	\$230,000	\$920,000	\$1,610,000
Office / Warehouse	\$200,000	\$0	\$0	\$200,000
Radio System	\$50,000	\$0	\$0	\$50,000
Pump System	\$150,000	\$0	\$0	\$150,000
Power & Phones	\$150,000	\$0	\$0	\$150,000
Total	\$3,860,000	\$230,000	\$1,920,000	\$6,010,000

An aerial photograph showing a valley fill sediment pond. The pond is a large, irregularly shaped body of water with a blue-green hue, situated in a valley. It is surrounded by dense green forest on the left and right sides. In the foreground, there is a field of tall, golden-brown grass. The text "VALLEY FILL SEDIMENT PONDS" is overlaid in the lower center of the image in a bold, yellow, serif font.

VALLEY FILL SEDIMENT PONDS

Economic Evaluation - Appalachia Mining Company

Capital Budget - Life of Mine

Total Capital

Item	Year	Year	Years	
Description	0	1	2 thru 10	Total
Heavy Equip.	\$0	\$34,190,000	\$15,210,000	\$49,400,000
Support Equip,	\$0	\$2,635,000	\$300,000	\$2,935,000
Development	\$3,860,000	\$230,000	\$1,920,000	\$6,010,000
Total	\$3,860,000	\$37,055,000	\$17,430,000	\$58,345,000

Economic Evaluation - Appalachia Mining Company

Manpower Table

Period: Full Year					C.T. Per M.H.		7.25	
# Production Days = 260 days					BCY Per M.H.		108.90	
Manpow er				Job	O.B.	# Prod.	Hrs. Per	Total
Position	Day	Evening	Total	Discription	Production	Day's	Day	Manhours
25 yd. Front Shovel	1	1	2	O.B. Loading	7,500,000	260	10	5,200
210 Ton Rock Truck	3	3	6	O.B. Haulage		260	10	15,600
Fill Dozer	1	1	2	Run Fill		260	10	5,200
18 1/2 yd. Backhoe	1	1	2	O.B. Loading	5,800,000	260	10	5,200
150 Ton Rock Truck	3	3	6	O.B. Haulage		260	10	15,600
Fill Dozer	1	1	2	Run Fill		260	10	5,200
16 yd. Endloader	1	1	2	O.B. Loading	4,100,000	260	10	5,200
150 Ton Rock Truck	2	2	4	O.B. Haulage		260	10	10,400
Fill Dozer	1	1	2	Run Fill		260	10	5,200
45 yd. Bull Dozer	4	4	8	Prod. Dozing	7,800,000	260	10	20,800
Development Dozer	2	2	4	Development		260	10	10,400
Reclamation Dozer	1	1	2	Reclamation		260	10	5,200
16 yd. Coal Loader	2	2	4	Coal Prep. & Ldg.		260	10	10,400
9 yd. Coal Loader	2	2	4	Coal Prep. & Ldg.		260	10	10,400
Drillers	4	3	7	O.B. Drilling		260	10	18,200
Motor Grader	1	1	2	Road Maint.		260	10	5,200
Water Truck	1	1	2	Dust Control		260	10	5,200
Mechanics / Welders	2	6	8	Maintenance		260	10	20,800
P.M. Technicians	1	2	3	Maintenance		260	10	7,800
Fueler / Greaser	1	1	2	Maintenance		260	10	5,200
Blasters	6	0	6	Blasting		260	10	15,600
Blasting Foreman	1	0	1	D & B Superv.		260	10	2,600
Prod. Foreman	1	1	2	Shift Superv.		260	10	5,200
Maint. Foreman	1	1	2	Maint. Superv.		260	10	5,200
Maintenance Planner	1	1	2	Maint. Scheduling		260	10	5,200
Prod. Engineer	1	0	1	Engineering		260	10	2,600
Superintendant	1	0	1	General Superv.		260	10	2,600
Total	47	42	89		25,200,000			231,400

Economic Evaluation - Appalachia Mining Company

E.B.I.T. (Earnings Before Interest and Taxes)

	Year #1			Year #2			Year #3			Year #4			Year #5		
Parameter	\$\$	\$\$ Per BCY	\$\$ Per C.T.	\$\$	\$\$ Per BCY	\$\$ Per C.T.	\$\$	\$\$ Per BCY	\$\$ Per C.T.	\$\$	\$\$ Per BCY	\$\$ Per C.T.	\$\$	\$\$ Per BCY	\$\$ Per C.T.
Revenues	\$41,524,634	\$1.65	\$24.75	\$41,524,634	\$1.65	\$24.75	\$41,524,634	\$1.65	\$24.75	\$41,524,634	\$1.65	\$24.75	\$41,524,634	\$1.65	\$24.75
Revenues Per Ton	\$24.75			\$24.75			\$24.75			\$24.75			\$24.75		
Non - Mining Costs:															
Sales Related Costs	\$6,116,285	\$0.24	\$3.65	\$6,116,285	\$0.24	\$3.65	\$6,116,285	\$0.24	\$3.65	\$6,116,285	\$0.24	\$3.65	\$6,116,285	\$0.24	\$3.65
Intercompany Roy.	\$0	\$0.00	\$0.00	\$0	\$0.00	\$0.00	\$0	\$0.00	\$0.00	\$0	\$0.00	\$0.00	\$0	\$0.00	\$0.00
Intercompany Comm	\$419,441	\$0.02	\$0.25	\$419,441	\$0.02	\$0.25	\$419,441	\$0.02	\$0.25	\$419,441	\$0.02	\$0.25	\$419,441	\$0.02	\$0.25
Trucking	\$3,445,007	\$0.14	\$2.05	\$3,445,007	\$0.14	\$2.05	\$3,445,007	\$0.14	\$2.05	\$3,445,007	\$0.14	\$2.05	\$3,445,007	\$0.14	\$2.05
Other Trans.	\$1,006,658	\$0.04	\$0.60	\$1,006,658	\$0.04	\$0.60	\$1,006,658	\$0.04	\$0.60	\$1,006,658	\$0.04	\$0.60	\$1,006,658	\$0.04	\$0.60
Preparation Costs	\$1,304,928	\$0.05	\$0.78	\$1,304,928	\$0.05	\$0.78	\$1,304,928	\$0.05	\$0.78	\$1,304,928	\$0.05	\$0.78	\$1,304,928	\$0.05	\$0.78
Subtotal	\$12,292,319	\$0.49	\$7.33	\$12,292,319	\$0.49	\$7.33	\$12,292,319	\$0.49	\$7.33	\$12,292,319	\$0.49	\$7.33	\$12,292,319	\$0.49	\$7.33
Net Realization	\$29,232,316	\$1.16	\$17.42	\$29,232,316	\$1.16	\$17.42	\$29,232,316	\$1.16	\$17.42	\$29,232,316	\$1.16	\$17.42	\$29,232,316	\$1.16	\$17.42
Indirect Costs:															
Overhead	\$1,215,933	\$0.05	\$0.72	\$1,080,647	\$0.04	\$0.64	\$1,001,678	\$0.04	\$0.60	\$927,778	\$0.04	\$0.55	\$889,564	\$0.04	\$0.53
Reclamation	\$251,664	\$0.01	\$0.15	\$251,664	\$0.01	\$0.15	\$251,664	\$0.01	\$0.15	\$251,664	\$0.01	\$0.15	\$251,664	\$0.01	\$0.15
Subtotal	\$1,467,597	\$0.06	\$0.87	\$1,332,311	\$0.05	\$0.79	\$1,253,342	\$0.05	\$0.75	\$1,179,442	\$0.05	\$0.70	\$1,141,228	\$0.05	\$0.68
Mining Costs:															
Labor	\$8,590,556	\$0.34	\$5.12	\$8,590,556	\$0.34	\$5.12	\$8,590,556	\$0.34	\$5.12	\$8,590,556	\$0.34	\$5.12	\$8,590,556	\$0.34	\$5.12
Supplies	\$11,451,473	\$0.45	\$6.83	\$11,451,473	\$0.45	\$6.83	\$11,451,473	\$0.45	\$6.83	\$11,451,473	\$0.45	\$6.83	\$11,451,473	\$0.45	\$6.83
Power	\$0	\$0.00	\$0.00	\$0	\$0.00	\$0.00	\$0	\$0.00	\$0.00	\$0	\$0.00	\$0.00	\$0	\$0.00	\$0.00
Other	\$0	\$0.00	\$0.00	\$0	\$0.00	\$0.00	\$0	\$0.00	\$0.00	\$0	\$0.00	\$0.00	\$0	\$0.00	\$0.00
Subtotal	\$20,042,029	\$0.80	\$11.95	\$20,042,029	\$0.80	\$11.95	\$20,042,029	\$0.80	\$11.95	\$20,042,029	\$0.80	\$11.95	\$20,042,029	\$0.80	\$11.95
Cash Margin	\$7,722,690	\$0.31	\$4.60	\$7,857,976	\$0.31	\$4.68	\$7,936,945	\$0.31	\$4.73	\$8,010,845	\$0.32	\$4.77	\$8,049,059	\$0.32	\$4.80
Cash Margin Per Ton	\$4.60			\$4.68			\$4.73			\$4.77			\$4.80		
Cash Cost Per Ton	\$20.15			\$20.07			\$20.02			\$19.98			\$19.95		
Direct D.D. & A.	\$5,292,144	\$0.21	\$3.15	\$5,292,144	\$0.21	\$3.15	\$5,292,144	\$0.21	\$3.15	\$5,217,144	\$0.21	\$3.11	\$5,229,644	\$0.21	\$3.12
Indirect D.D. & A.	\$0	\$0.00	\$0.00	\$0	\$0.00	\$0.00	\$0	\$0.00	\$0.00	\$0	\$0.00	\$0.00	\$0	\$0.00	\$0.00
Subtotal	\$5,292,144	\$0.21	\$3.15	\$5,292,144	\$0.21	\$3.15	\$5,292,144	\$0.21	\$3.15	\$5,217,144	\$0.21	\$3.11	\$5,229,644	\$3.12	\$3.12
E.B.I.T.	\$2,430,546	\$0.10	\$1.45	\$2,565,832	\$0.10	\$1.53	\$2,644,801	\$0.10	\$1.58	\$2,793,701	\$0.11	\$1.67	\$2,819,415	\$0.11	\$1.68
CY Removed	25,200,000			25,200,000			25,200,000			25,200,000			25,200,000		
BCY Per Manhour	108.90			108.90			108.90			108.90			108.90		
% Direct Ship	80.00%			80.00%			80.00%			80.00%			80.00%		
Mine Recovery	80.36%			80.36%			80.36%			80.36%			80.36%		
Tons Produced / Sold	1,677,763			1,677,763			1,677,763			1,677,763			1,677,763		
Days Worked	260			260			260			260			260		
Man Hours Worked	231,400			231,400			231,400			231,400			231,400		
Strip Ratio	15.02			15.02			15.02			15.02			15.02		
Tons Per Man Hour	7.25			7.25			7.25			7.25			7.25		

Economic Evaluation - Appalachia Mining Company E.B.I.T. (Earnings Before Interest and Taxes)

	Total Project		
		\$ \$ Per	\$ \$ Per
Parameter	\$ \$	BCY	C.T.
Revenues	\$405,800,604	\$ 1.65	\$24.75
Revenues Per Ton	\$24.75		
Non - Mining Costs:			
Sales Related Costs	\$59,771,560	\$0.24	\$3.65
Intercompany Royalties	\$0	\$0.00	\$0.00
Intercompany Commissions	\$4,098,996	\$0.02	\$0.25
Trucking	\$33,666,422	\$0.14	\$2.05
Other Transportation Costs	\$9,837,593	\$0.04	\$0.60
Preparation Costs	\$12,752,441	\$0.05	\$0.78
Subtotal	\$120,127,012	\$0.49	\$7.33
Net Realization	\$285,673,592	\$1.16	\$17.42
Indirect Costs:			
Overhead	\$8,996,465	\$0.04	\$0.55
Reclamation	\$2,459,394	\$0.01	\$0.15
Subtotal	\$11,455,859	\$0.05	\$0.70
Mining Costs:			
Labor	\$83,956,796	\$0.34	\$5.12
Supplies	\$112,056,241	\$0.45	\$6.83
Power	\$0	\$0.00	\$0.00
Other	\$0	\$0.00	\$0.00
Subtotal	\$196,013,037	\$0.80	\$11.95
Cash Margin	\$78,204,696	\$0.32	\$4.77
Cash Margin Per Ton	\$4.77		
Cash Cost Per Ton	\$19.98		
Direct D.D. & A.	\$51,691,246	\$0.21	\$3.15
Indirect D.D. & A.	\$0	\$0.00	\$0.00
Subtotal	\$51,691,246	\$0.21	\$3.15
E.B.I.T.	\$26,513,450	\$0.11	\$1.62

Cubic Yards Removed	246,283,400
BCY Per Manhour	108.90
Percent Direct Ship	80.00%
Mine Recovery	80.36%
Tons Produced / Sold	16,395,984
Days Worked	2,600
Man Hours Worked	2,261,507
Strip Ratio	15.02
Tons Per Man Hour	7.25

Economic Evaluation - Appalachia Mining Company

[illegible]

SUMMARY

- **Coal Recovery**
 - Surface = 16,395,984 CT
 - Underground = 5,540,832 CT
 - Upper Clarion and Coalburg seams only.
 - CT based on 60% mine recovery.
 - Underground only recovers 33.8% of the area reserves.
- **Total Direct Mine Hours Worked**
 - Surface = 2,261,507 Hrs.
 - Underground = 871,201 Hrs.

Surface Mining will provide more employment in this reserve area.

SUMMARY (CONT.)

- **Taxes Generated from the Project:**

– Personal Property Tax	\$ 3,132,574	\$0.19 per ton
– Worker's Compensation	\$ 5,559,085	\$0.34 per ton
– Matching F.I.C.A.	\$ 3,097,378	\$0.19 per ton
– Unmined Mineral Tax	\$ 1,173,000	\$0.07 per ton
– Franchise Tax	\$ 504,390	\$0.03 per ton
– Severance Tax	\$20,290,033	\$1.24 per ton
– Black Lung Tax	\$ 8,747,264	\$0.53 per ton
– Federal Reclamation Tax	\$ 5,566,431	\$0.34 per ton
– WV Special Assessment	\$ 819,798	\$0.05 per ton
– <u>Federal & State Income Tax</u>	<u>\$ 9,183,734</u>	<u>\$0.56 per ton</u>
– Total Tax Expense	\$58,073,684	\$3.54 per ton

SUMMARY (CONT.)

- **Tax savings if this job was operated in another state.**
 - **Kentucky** **\$ 4,189,994**
 - **Virginia** **\$12,187,134**
- **Total Direct Wages and Benefits earned from the Project**
 - **\$ 83,796,596**
- **Total Purchases of Services, Materials and Supplies from the Project**
 - **\$145,722,663**
- **Total Capital for the Project**
 - **\$ 58,345,000**
- **Return on Investment (ROI) for the Project.**
 - **9.60%**

SUMMARY (CONT.)

FINAL EVALUATION - APPALACHIA MINING COMPANY

- **The Project is marginally feasible as planned**
- **If costs are increased due to regulatory changes, the project will not be feasible.**
 - **Increase in haul distances or grade.**
 - **Increase in taxes**
 - **Increase in permitting related expenses**
 - **Increase in blasting costs**
 - **Increase in litigation**
 - **Etc.**

SUMMARY (CONT.)

FINAL EVALUATION - APPALACHIA MINING COMPANY

- **The mountain is reclaimed in an environmentally responsible manner**
 - **Commercial Woodland**
 - **Fish & Wildlife**
 - **Residential**
 - **Farming**
 - **Commercial Livestock**
 - **Etc.**



FINAL AOC RECLAMATION

A landscape photograph showing a grassy field with a line of trees in the background and a rainbow in the sky. The text "FINAL AOC RECLAMATION" is overlaid in the center.

FINAL AOC RECLAMATION



**FINAL AOC
RECLAMATION**

A landscape photograph showing a grassy hill and a body of water under a clear blue sky. The foreground is a mix of green grass and brown, rocky soil. In the middle ground, there is a large, rounded hill covered in green grass. To the left of the hill, there is a dense line of dark green trees. To the right of the hill, there is a body of water, possibly a lake or a reservoir, with a small, dark, rocky island in the distance. The sky is a clear, light blue. The text "FINAL AOC RECLAMATION" is overlaid in the center of the image in a bold, yellow, serif font.

FINAL AOC RECLAMATION



**PROGRESSIVE
CONTEMPORANEOUS
RECLAMATION**

An aerial photograph showing a large dam and reservoir. The dam is a long, straight structure made of earth and stone, with a rocky spillway on the left. The reservoir is a large body of water on the right, surrounded by green hills and dense forest. The text "PROGRESSIVE PHASES OF CONTEMPORANEOUS RECLAMATION" is overlaid in yellow, serif, all-caps font in the lower center of the image.

PROGRESSIVE PHASES OF CONTEMPORANEOUS RECLAMATION

***IN WEST VIRGINIA , MOUNTAINTOP
REMOVAL MINING CAN BE HALTED
BY SIMPLY MAKING IT COST
PROHIBITIVE.***

***IF MINING IS STOPPED IN THIS
MANNER, IT CAN BE CLAIMED THAT
MINING IS STILL FEASIBLE, BUT THE
COMPANY DECIDED NOT TO DO THE
PROJECT.***

A TRUE “POLITICAL SPIN” SOLUTION